What is claimed is:

1. A method for determining the optical retardation value of an anisotropic material comprising:

polarizing a light beam having at least a portion of the wavenumbers between about 4,000 to about 10,000 cm^{-1} to obtain a polarized light beam;

passing the polarized light beam through the material to obtain a transmitted beam;

polarizing the transmitted beam to obtain a polarized transmitted beam;

detecting the polarized transmitted beam;

collecting an absorbance or transmission spectra as a function of wavenumbers in at least a portion of the range between about 4,000 to about 10,000 cm^{-1};

calculating the optical retardation value of the material using the spectra.

2. A method for determining the birefringence value of an anisotropic material having at least one thickness, comprising:

polarizing a light beam having at least a portion of the wavenumbers between about 4,000 to about 10,000 cm^{-1} to obtain a polarized light beam;

passing the polarized light beam through the material to obtain a transmitted beam;

polarizing the transmitted beam to obtain a polarized transmitted beam;

detecting the polarized transmitted beam;

collecting an absorbance or transmission spectra as a function of wavenumbers in at least a portion of the range between about 4,000 to about 10,000 cm^{-1};

calculating the optical retardation value of the material using the spectra; and

determining the birefringence value of the material according to the formula:

$$R = \Delta n d$$

where R = optical retardation value, □n is the birefringence value and d is the thickness of the material.

3. A method of optimizing a first physical property of an anisotropic material during its manufacture comprising:

polarizing a light beam having at least a portion of the wavenumbers between about 4,000 to about 10,000 cm^{-1} to obtain a polarized light beam;

passing the polarized light beam through the material to obtain a transmitted beam;

polarizing the transmitted beam to obtain a polarized transmitted beam;

detecting the polarized transmitted beam;

collecting an absorbance or transmission spectra as a function of wavenumbers in at least a portion of the range between about 4,000 to about 10,000 cm^{-1};

calculating the optical retardation value of the material using the spectra;

determining the birefringence value of the material according to the formula:

$$R = \Delta n_{sample}\ d$$

where R = optical retardation value, Δn_{sample} is the birefringence value and d is the thickness of the material;

locating the value of Δn_{sample} on a previously prepared curve of the first physical property of the material plotted as functions of birefringence and a first process parameter;

identifying an initial first physical property and initial first process parameter associated with Δn_{sample};

selecting a desired value for the first physical property of the anisotropic material and identifying the target first process parameter corresponding to the desired value on the previously prepared curve; and

adjusting the initial first process parameter to the target first process parameter to optimize the first physical property of the material.

4. The method of claim 1, 2 or 3 where the step of collecting the absorbance or transmission spectra as a function of wavenumbers in at least a portion of the range between about 4,000 to about 10,000 cm^{-1} further comprises generating a series of peak maxima; and the step of calculating the optical retardation value of the material using the spectra comprises using the location of peak maxima.

5. The method of claim 4 where the step of calculating the optical retardation of the material using the location of peak maxima comprises assigning an order value to at least two successive peak maxima in the series;

determining the wavenumbers that correspond to the at least two successive peak maxima in the series; and

establishing the slope of the linear relationship between the order values of the at least two consecutive peak maxima and the wavenumbers corresponding to those maxima, to obtain the optical retardation value.

6. The method of claim 3, where the step of passing the polarized light through the material is performed on-line or off-line.

7. The method of claim 6 where the step of passing the polarized light through the material is performed on-line and the material is a polymeric fiber having fiber diameter ranging from 1 to 100 mils.

8. The method of claim 1, 2 or 3 where the material has at least one axis of orientation and the light beam having at least a portion of the wavenumbers between about 4,000 to about 10,000 cm^{-1} is polarized at 45° degrees from the orientation axis of the material.

9. The method of claim 8, where the transmitted beam is polarized in a plane disposed substantially perpendicular to the first plane.

10. The method of claim 1, 2 or 3 where the polarized light beam initially contacts the material substantially perpendicular to the axis of orientation of the material.

11. The method of claim 1, 2 or 3 where the material is selected from the group consisting of a polymeric film, a fiber or a liquid crystal.

12. The method of claim 3 where the first physical property is selected from the group consisting of breaking strength retention, knot strength, stress at maximum load, transparency, maximum elongation, Young's Modulus (stress/strain), bioabsorption rate, and therapeutic agent release profile.

13. The method of claim 3 where the first process parameter is selected from the group consisting of draw ratio, annealing oven temperature, godet speed, and extrusion throughput.

14. A Fourier transform near infrared spectrophotometer comprising:

source means for generating a light beam having at least a spectral range between about 4000 cm^{-1} and 10,000 cm^{-1};

first polarizer means for polarizing the light beam in a first plane to produce a polarized light beam;

holder means for holding a material in the path of the polarized light beam so that at least a portion of the polarized light beam is transmitted though the material as a transmitted beam;

second polarizer means for polarizing the transmitted beam in a second plane substantially 90 degrees to the first plane to produce a polarized transmitted beam; and

detector means for receiving the polarized transmitted beam.

15. A Fourier transform near infrared based system comprising:

a Fourier transform near infrared spectrophotometer having source means for generating a light beam having at least a spectral range between about 4000 cm^{-1} and 10,000 cm^{-1} and detector means; and

a sample cell comprising first polarizer means for polarizing the light beam in a first plane to produce a polarized light beam; holder means for holding a material in the path of the polarized light beam so that at least a portion of the polarized light beam is transmitted though the material as a transmitted beam; and second polarizer means for polarizing the transmitted beam in a second plane substantially 90 degrees to the first plane to produce a polarized transmitted beam;

wherein the polarized transmitted beam is directed to the detector means of the FT-NIR spectrophotometer and the sample cell is substantially remote to the FT-NIR spectrophotometer.

16. A sample cell to be used in combination with a Fourier transform near infrared spectrophotometer comprising:

first polarizer means for polarizing a light beam comprising wavenumbers between about 4,000 to about 10,000 cm^{-1} in a first plane;

holder means for holding a material in the path of the polarized light beam so that at least a portion of the polarized light beam is transmitted though the material as a transmitted beam; and

second polarizer means for polarizing the transmitted beam in a second plane substantially 90 degrees to the first plane to produce a polarized transmitted beam.